Final Report

Submitted to:
Air Force Office of Scientific Research
801 N. Randolph Street, Room 732
Arlington, VA 22203-1977

ATTN.: Dr. Howard Schlossberg

1) Date submitted: MAY 16, 2000

2) Title: DURIP 98-99 OPTICAL FIBER GRATINGS USING UV LIGHT

3) Principal Investigator: JACK FEINBERG, DEPARTMENT OF PHYSICS
Office: (213) 740-1134, Fax: (213) 740-6653

4) Time period covered: March 1, 1998 - August 31, 1999

5) Institution Name: UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES, CALIFORNIA 90089-0484

6) Federal agency identifying award number: F49620-98-1-0270

7) Special circumstances regarding equipment acquisition: None

01 Mar 98 31 Aug 98

FINAL REPORT

F49620-98-1-0270

DURIP 98-99 OPTICAL FIBER GRATINGS SUING UV LIGHT

This is an "equipment only" grant under the Defense University Research Instrumentation Program. A report of the results obtained with this equipment is contained in the reports for Grant F49620-98-1-0051, "OPTICAL FIBER GRATINGS USING NEAR-UV LIGHT." To avoid duplication of paperwork, only a partial summary of those report will be duplicated here. This grant is to investigate the physical properties of gratings written in optical fibers using ultraviolet light. The equipment purchased in this grant includes:

Equipment Description	**Expense**
Lexel - Argon Laser	$41,135
Bruker - EPR Spectrometer System Upgrade	$8,874
Newport Corporation - precision long-travel stage	$12,413
Deltronic Crystal Industries - crystals	$5,424
Computer System for motion controllers	$14,749
Integrated Photonic Systems - motion controller system	$5,461
Coherent - UV laser tube	$33,449
Vytran Corporation - fusion splicer and fiber strength tester	$38,150

Key accomplishments using the above equipment are:

1) We performed experiments to reveal how light alters the refractive index of germanium-doped optical fibers. We found that loading the fiber with hydrogen turns on a separate physical mechanism so that all of the Ge atoms become photosensitive, instead of only the Ge defects.

2) We perfected methods of writing long-period gratings in fibers with no unwanted harmonics or sidelobes.

3) We fabricated a large number of fiber gratings in germanium-doped fibers and supplied these gratings to other research groups for demonstration of systems applications. These include using fiber gratings as adjustable dispersion compensators and as adjustable delay elements in a fiberoptic network.

4) We performed and presented new results on the strength of gratings written through the polymer coating of optical fibers.

5) We invented a new type of fiber sensor that needs no spectrometer and that works in real time. It senses either temperature or strain.

REPORT DOCUMENTATION PAGE

AFRL-SR-BL-TR-00-

0230

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
		01 Mar 98 to 31 Aug 98 Final

4. TITLE AND SUBTITLE
DURIP 98-99 Optical Fiber gratings using UV Light

5. FUNDING NUMBERS
61103D
3484/US

6. AUTHOR(S)
Professor Feinberg

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Univ of Southern California
837 West 36th Plaza STO-330
Los Angeles CA 90089-1147

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
AFOSR/NE
801 North Randolph Street Rm 732
Arlington, VA 22203-1977

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
F49620-98-1-0270

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT
APPROVAL FOR PUBLIC RELEASED; DISTRIBUTION UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This is an "equipment only" grant under the Defense University Research Instrumentation Program. A report of the results obtained with this equipment is contained in the reports for Grant F49620-98-1-0051, "OPTICAL FIBER GRATINGS USING NEAR-UV LIGHT."

14. SUBJECT TERMS

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL